THERMISTOR DEVICE, THERMISTOR DEVICE MANUFACTURING METHOD AND TEMPERATURE SENSOR

ABSTRACT OF THE DISCLOSURE

The thermistor portion of a thermistor device consists of a mixed sintered body of $\mathbf{a}Y(Cr_{0.5}Mn_{0.5})O_3 \cdot \mathbf{b}Al_2O_3$ made of the perovskite-type compound $Y(Cr_{0.5}Mn_{0.5})O_3$ and Al_2O_3, or a mixed sintered body of $\mathbf{a}Y(Cr_{0.5}Mn_{0.5})O_3 \cdot \mathbf{b}(Al_2O_3+Y_2O_3)$ made of $Y(Cr_{0.5}Mn_{0.5})O_3$, Al_2O_3 and Y_2O_3. The mole fractions **a** and **b** have the relationships $0.05 \leq \mathbf{a} < 1.0$, $0 < \mathbf{b} \leq 0.95$ and $\mathbf{a}+\mathbf{b}=1$. This is required to obtain a thermistor device that has stable characteristics and exhibits a small change in its resistance value, even in a heat history from room temperature to 1000°C or the like, and also has a resistance value of 50 Ω to 100 kΩ in the temperature range from room temperature to 1000°C.

The precursor compounds triethoxy yttrium, diethoxy manganese and tris (2,4-pentadiono) chromium are mixed in a mixed solvent of ethanol and isopropyl alcohol, and refluxing is performed to obtain a composite metal alkoxide solution. Then the metal salt precipitating agent of deionized water is added, the mixture is stirred and mixed and refluxing is performed to obtain a gelatinous precipitate of metallic salts containing Y, Mn and Cr. This precipitate is separated by filtration, dried and calcined to obtain powdered raw material with a composition of $38Y(Cr_{0.5}Mn_{0.5})O_3 \cdot 62Y_2O_3$, the same as that of a thermistor device. Thereafter, this powdered raw material is molded and sintered to obtain the thermistor device as a sintered body. Thereby, the

dispersion of the resistance value of the thermistor can be reduced.

An anti-reducing coating made of an anti-reducing material such as Y_2O_3, Al_2O_3, $Y_3Al_5O_{12}$, $3Al_2O_3 \cdot SiO_3$, Y_2SiO_5 or the like is formed on the surface of a thermistor portion consisting of a mixed sintered body of $Y(CrMn)O_3 \cdot Y_2O_3$ (or $Y(CrMn)O_3 \cdot Al_2O_3$) or the like to form a thermistor device with a pair of lead wires attached. Thereby, the thermistor device exhibits resistance value stability even when subjected to a reducing atmosphere.